Notes of the
Virtual APEC Workshop
Implementation of Port State Measures Under the APEC Roadmap on Combatting IUU Fishing

Date	Thursday 22 July 2021
Time	1400-1710 hours
Venue	Live streaming from Wellington, New Zealand

1 Welcome and Housekeeping

Mr Patrick English, MC, welcomed everyone to the workshop. Today forty economies are represented throughout APEC and beyond. The New Zealand theme for the workshop is to join, work and grow together. The impact and loss due to COVID-19 was acknowledged; economies continue to manage and learn. This has resulted in Port State Measures (PSM) being impacted. Today we will hear about the issues and responses and impact and legacy etc (from day one). Let us leave a legacy. In Maori, it is about tangata tangata tangata (it is about people, people, people). Tackling IUU (illegal, unregulated and unreported) requires participation, cooperation and commitment.

Let us leave a legacy. In Māori culture, it is about tāngata tāngata tāngata (it is about people, people, people). IUU through PSM can be tackled with cooperation and participation with everyone.

The project workshops have been a critical contributor to the APEC Roadmap on Combatting IUU Fishing. The Roadmap provides a comprehensive outline of initiatives, which will help to combat IUU fishing. This workshop is an action in the Roadmap.

Mr English outlined the project objectives, which has an overall arching theme of building capacity within economies to build PSM:

- To identify barriers and opportunities being faced by APEC economies in implementing port state measures
- To examine how port state measures can effectively combat Illegal, Unreported and Unregulated fishing in light of the economic pressures encountered because of the global pandemic of COVID-19
- To develop resources and recommendations for policy settings and capacity building activities which could helpfully be built upon to enhance port state measures.

One of the key outputs will be to provide an online repository, which will feature resources that will provide insight into key PSM implementation issues.

There is an opportunity to build our knowledge.

Presentations are being recorded but not the question and answer sessions. If presenters are unable to answer questions during their session they will do this later in writing. The programme will be conducted in English and participants are asked to speak slowly and in short sentences.

Highlights from yesterday included:

- Co-operation is key
- People are both the solution and part of the problem; they are beneficiaries and most likely to be impacted
- Technology and data – the technology is in place but buy-in is required from member economies
- Funding is an issue
- Indigenous (Māori) perspective – we are responsible now and also for future generations

Themes for today's workshop were outlined as follows:

- Emerging technologies
- Pacific focus on application
- Recommendations from the workshop.

Participation in the workshop was encouraged.

2 Theme- Emerging Technologies

2.1 Mr English introduced and welcomed Bubba Cook, Western and Central Pacific Tuna Programme Manager, World Wide Fund for Nature (WWF), New Zealand.

Mr Cook gave a PowerPoint presentation on Seafood and Fisheries Emerging Technologies

Seafood and Fisheries Emerging Technologies 2020-21 SAFET Conference is complete
A background was provided
WWF combined forces with Environmental Defense Fund for a virtual conference to look at cutting edge technologies
Data collection is key for PSA and IUU

Emerging Technologies
Catch documentation and traceability
Unmanned surveillance
Electronic monitoring
AI and machine learning
Genetics, biochemical markers and spectrometry
Integrated satellite imaging and tracking
Cryptocurrencies and blockchain
Data management solutions

Catch Documentation and Traceability
Paper no longer an option.
Key take home is data catchment through IT

Unmanned surveillance
Aerial drones
Remote sensing can help with IUU and verify data sources
Could play a role in PSM

Electronic Monitoring
Technology is more compact, robust and capable of achieving observation. Discussion around WIFI
AI modules built in NZ in camera

Artificial Intelligence
Earpiece could translate any language as a fisheries officer boards a vessel

DNA Barcoding

Genetic tools will become standard in the future. COVID-19 has been driving this
Low cost, hand-held tool.
Can positively identify a fish

Biochemical tracking
Can play a valuable role in verifying and validating e.g. the orgin ocean of a certain tuna

Hyperspectral imaging
Could classify and identify fish. Room for more exploration.

Integrated satellite imaging and tracking
Offers us more accurate estimations of tracking
Radar can be used in a new way to fill in blanks by analysing radar data

Blockchain
Markets will become more discerning as to where people will source their fish
Current technology development could lead to a level of accountability in fisheries that will be unprecedent

Data management
Volume, variety, velocity, veracity
Big data analytical tools will become critical.

Emerging Technologies
People are our biggest asset. People need to be trained to execute the technology.

Website/Contact details
WWw.seafoodandfisheriesemergingtehcnology.com
info@seafoodandfisheriesemergingtechology.com

Mr Cook was thanked for his presentation.

2.2 Question and answer session led by Mr English.

Mr English asked what are the most effective and emerging technologies? What is the accessibility and cost?

Mr Cook's response: Funding will be a big hurdle for people to overcome. The technology applications are becoming less expensive and more readily available. There is a need to move towards more digitised systems that start capturing data as opposed to using paper and transferring it into a digital platform. These need to be funded in a

sustainable way. Donor funding is not a good way to do this. Reinvestment needs to happen from institutions in terms of cost recovery mechanisms.

Mr English stated that IUU is a cost in excess of $7 billion. There are some savings to be made. How do you get people to sign up for these technologies?

Mr Cook's response: There is a huge volume of research in determining technologies and how these are being adopted. It is difficult for people to take these up unless you can demonstrate incentives in adoption. There is a need to be able to demonstrate incentives and show how there is an Increase in efficiency or improvement in economic returns. There is a further need to show that purchased technology is achieving objectives.

Mr Wright stated that identifying fish species in a port inspection that processes at sea can be problematic. There are some trunks of fish with no other features. In relation to genetic testing devices, does it need an internet link to the device or can it be worked offline? How do devices work in a fish hold at minus sixty degrees?

Mr Cook's response: The goal is for the unit to be self-contained and hand-held. It can operate independently. The run time has been reduced. This improves the number of samples you can run through the system. The next generation system will available in October 2021. COVID-19 has driven these types of technologies in an increased manner. There will be more advancement of the technology in the future. Technologies have been tested for a range of temperatures but he was unsure about minus sixty degrees.

Mr Wright referred to unmanned surveillance. In terms of legal aspects, has there been any case studies on use of imagery collected and used in any type of prosecution?

Mr Cook's response: He was unsure about prosecuting vessels. He referred to a case (possibly Chile) where a drone was used that identified fish being dried on roofs. Fixed-wing water-landing drones have been used to collect information. This was used as background to demonstrate to the government that there were incursions into protected areas. It has not matured to the level where enough information has been available for a particular prosecution.

2.3 Mr English introduced and welcomed Dr Jessica Ford, Research Scientist, Oceans & Atmosphere, CSIRO, Australia. Apologies were received from Dr Chris Wilcox Senior Principal Research Scientist.

Dr Ford gave a PowerPoint presentation on Emerging Technologies to support fisheries MCS.

Challenges in detection
Two key issues:
Data volume
Information cost
These propagate down to local level
VMS is typical processed with a mix of automated alerts and human examination.
Surveillance centres often struggle to examine data deeply.
Costs of security often limit data access

CSIRO Research strategies and goals
A research program with two key objectives:
Analytic tools to extract information from existing data
Develop new low-cost surveillance data sources

Diagram on CSIRO MCS Analytics Team

Improving Information from AIS
Globally tens of billions of signals every year
Problem of too much data
Behaviour tells us about potential actions and intentions
How to identify persons, vessels and areas of interest? - Avoiding monitoring, movement and behaviour, connections and risk

Suspicious versus illegal
Focusing on events and behaviours which are suspicious
Suspicious examples: Vessel name: 'Nauticast', movement and behaviour atypical, illegality

Automating for many vessels
Many vessels with a lot of data – how do you prioritise which vessels to view?
What's normal, what is expected, and what do we see?
Identify irregular behaviour using statistically robust methods

Quantative Risk Assessments diagram – traffic light approach used
Examples provided

Any risk assessment is a positive addition

Building a risk overview

Turning IUU indicators into a risk score e.g. movement, behaviour, association, flag quality, vessel details, history, rendezvous

Gaps can occur for a variety of reasons. Can depend on where a vessel is. Important to understand context as to how and where a vessel is moving.

Risk assessment overview – multi-step process

Raw AIS data, summarised data, analysis

Discovery of behaviours and areas of interest

Vessels sharing MMSI
AIS off for periods
Moving in and out of high-risk area
Loitering in areas for no obvious reason
Uneconomical tracks

Persons and Vessels of Interest

Understanding how flags, companies and fleets operate
Who are the key players and conduits of trade
Use Social Network Analysis
Understand fleet dynamics
Disentangle complex interactions across fleets
Measure degree of interactions, connectedness
Propagating known risk to 'friends'

Social network analysis – Pacific

Identify
Central players in a fishing network
Tankers are interconnected across fleet
Reefers operate with specific fleets
Flag level partnerships of trade
Fishing vessels maybe acting as reefers
Subnetworks
Most connected
Importance weighted by neighbours

Machine learning – anomaly detection
Track predicting

Making this information available on request
Processing large amounts of data
Priorities high-risk vessels
Moving to a ML framework
Available in near real-time streaming
Looking for implementation partners

Approaches to Reducing Data Cost
Ship detection from radar satellites
Hydrophones for fisheries and MPAs
Collecting surveillance data from ships of opportunity
Automating long-range surveillance cameras

Harvesting ship's radar as low-cost surveillance data
All commercial vessels carry navigation radars
Typical ranges are 90 to 180 km radius
Navigation radars automatically detect other vessels

Integrating across vessels – a regional picture
Vessel detections can be integrated across multiple ship radars
Allows for construction of tracks
Detection of activities
Likely port visions

Protyping radar harvesting as a system
Goal: Develop a system for capturing, transmitting and fusing vessel navigation radars as a surveillance and monitoring feed
Phase 1
•Feasibility of harvesting radar data; develop prototype data logging system; implement prototype on CSIRO vessel; statistical integration of data to get vessel sources, routes and location

Trials with RV Investigator

Currently three years in operation with RV Investigator
Typical radar range ~275 km radius
Target acquisitions, track construction complete
Developing detection function for vessels and ocean conditions
Working on estimating source ports, activity areas, and vessel densities

What do coverage and detections look like? - graph

Rolling out radar harvesting as low-cost surveillance data
Phase 2
Current implementations – Indonesia, Great Barrier Reef, Indian Ocean, Pacific, Arafura Sea.

A vision for free fisheries surveillance data
Radar loggers as a license condition
Compare to satellite radar - $2,000 per 50 km x 50 km
Just using tuna vessel positions from AIS, nearly complete coverage of IOTC and WCPFC.
These are low-cost sources and it only takes a few hours to install a data logger, which is the size of a mobile phone.

Dr Ford was thanked for her presentation.

2.4 Question and answer session led by Mr English.

Mr English asked how far is it from implementation?

Dr Ford's response: It has been implemented. One Indonesian vessel has been using it for their fisheries survey. It has been rolled out in Australia in the last six months, as well as the Indian Ocean, Pacific, and Arafura Sea. Data loggers are being made available internally. Dr Ford encouraged those with an interest to get in touch with her.

Mr English asked a question on behalf of a participant. Can these data loggers be installed on aerial platforms/surveillance aircraft?

Dr Ford's response: It can be installed if it has a radar.

Mr Wright asked if she saw a time when VMS data would be available to the public as AIS data?

Dr Ford's response: This has been an ongoing discussion. It is important to keep in mind that fishing activity is a business. Care needs to be taken as to who has access to the data. It is important to have discussions around sharing data between economies.

Mr Wright stated that risk assessment is key. With the model, how easy is it to inject new sources of data and information into the model?

Dr Ford's response: A survey has been completed that looked at 50 indicators regarding priority and ranking. Additional sources can be added and is a key aspect.

Mr English asked a question on behalf of a participant. What happens to the data that is collected? e.g. if fishing vessels were to have the system installed on a voluntary basis at this point will the data be available to the flagstate of the vessel? Where is the data shared to?

Dr Ford's response: Work is being undertaken towards data sharing. Benefits are being noted along with its low cost.

Comment from NZ/Mr Francisco Blaha: Many economies are voluntarily releasing VMS data to the public via IAS platforms like GFW. The Marshall Islands are currently going through the process.

3 Theme – Pacific Focus on Application

3.1 Mr English introduced and welcomed Mr Francisco Blaha, Fisheries Consultant, Pacific Economies.

Mr Blaha gave a PowerPoint presentation on Port State Measures Implementation in the Marshall Islands. He acknowledged his colleagues in the Marshall Islands.

Marshall Islands – Where are we?

Critical Tracking Events over "state" type obligations – table

Focus of this presentation will be on Port State perspective

What we mean by operations?
Basic definitions
The operational aspects of fishing gears in vessels
The basics of understanding catch legality
The rights and responsibilities as an officer
The basic of landing monitoring
The need of fishing vessels departure clearance check

IS – Intelligence/VMS – Boarding = Biological sampling monitors – Observers –
Legal/enforcement agents – diagram
Mapped to understand it

Republic of Marshall Islands
Fisheries Port Operations Management
Identified Needs and Proposed Recommendations - Manual

PMS Visual map inside our Port Operations - 1

Low tech – The port on a whiteboard

The bliss of good tools – FFAs Regional Picture, PNA's FIMS

Intelligence Analysis – for now manually
Identity, licencing, manoeuvring

Arriving Vessel Intelligence Report

PSM visual map inside our Port Operations – 2

Boarding and inspection – log books

Monitors – off duty observers that are on board during the length of transhipment

Our PSM Visual Map inside our Port Operations – 3

Our collaboration with Thailand
MOU with Thailand – PSM based clearance data for the verified weights per FV

How PSM relates to CDS?
Fishery wide integral Catch Documentation Scheme

Mr Blaha was thanked for his presentation.

3.2 Question and answer session led by Mr Wright.

Mr Wright asked a question from a participant: How do you manage interagency cooperation in implementing PSM especially the link between PSM and PSC?

Mr Blaha's response: People, people, people. The advantage of being in a small place is that we know each other. It is also about leadership, having a great team and making change. There is a need to have trust and people need to trust you. Moving information is about creating a human bridge. People need to be looked after. The bigger the challenge, the bigger resources you have.

4 Break: 1600-1612

Video -Sernapesca.cl

5 Panel discussion on Pacific Perspectives on Port State Measures moderated by Mr English.

Mr English welcomed and introduced the panellists: Mr Alois Kinol (Papua New Guiana), Mr Julian Tamehana (New Zealand) and Mr Francisco Blaha (Pacific Economies).

Mr English stated that there is a need to acknowledge that PSM in developing states can be a burden. This burden can be lightened with port state authorities. There is a sea view level.

Opening comments from Papua New Guinea (PNG) – He thanked the workshop facilitators and co-ordinators. There were good insights from yesterday's workshop. He

acknowledged New Zealand as host and for PNG to be given the the opportunity to participate and was looking forward to the workshop outcomes. PNG is still in the process of exiting PSA.

Mr Kinol stated that the PNG focus is on the implementation of what we are currently doing.

A PowerPoint presentation was given on the Implementation Updates of PNG PSM.

Overall implementation
Common centre – central nervous system
Monitoring vessels
Analysis and risks determination
Operational ports (x4)
Analysis and risks determination
Port entry authorisation
Boarding and inspection
Unloading/port use authorisation
Departure clearance

PSM Schematic Diagram
Provided a background as to the process.

2020 Port Calls
Total of 970 vessels entries throughout the ports
On average of 77 vessels per month
All data is shared

Work in Progress
Review and development of PSM SOP
Draft SOP completed
e-PSM (FIMS)
Scoping and development in progress

COVID-19: Each vessels crew must have a temperature reading. There is limited space for quarantine vessels. Going to different ports to quarantine is a challenge.

Challenges

Capacities in operational ports - Internet access; office facilities; manpower

Interagency(NFA/Customs/NAQIA/DOH) - Lack of exchange of information and understanding of each function (challenges with Customs); boarding, inspection of authorisation of fishing vessels

Impact of COVID-19 on port operations

Going forward

Internal/external consultation: industry, line agencies

Implementation of Draft SOP

Training and Capacity building

Import capacities in ports

Mr Kinol was thanked for his presentation.

Mr Tamehana: It has been an interesting couple of days. The presentations have been informative. As a fishery officer at the tactical level, sometimes we do not get exposed to the strategic level work being undertaken. He was reassured at the amount of work going on around the world and the innovations. He was impressed with the PMS schematics and with the discussion. He has enjoyed participating in the workshop.

Mr Blaha: A lot of this goes back to people. The relationships with people in the region are important. Communication is important and will be improved if we trust others. Information sharing is based on trust along with respect for each other's work. The human side is just as important as the technology side.

Question from Malaysia: According to a 2020 study conducted by STATISTA, losses due to IUU fishing in Western and Central Pacific which includes South China Sea was estimated to be USD3.4 billon. Is there any plan by CSIRO to conduct an IUU fishing risk analysis in SCS in the near future and recommend certain measures to overcome it?

Dr Ford responded: FAO on providing a review of IUU in the APFIC region. She would be interested in extending this to others in the region. Likewise, with other national and regional risk assessment. This works as a survey.

Mr Kinol: Mobilise everyone together including all agency heads. From the Minister, weight was applied to getting agencies to come together. PSM is a written obligation.

They are already doing authorising activities. There are common and domestic laws. In terms of PSM, which came into force in 2016, this was a new concept for PNG. We came on board and everyone is happy. FAO was acknowledged. Everyone is aware of the obligations. There is one SOP for everyone: customs, quarantine, ports. Everybody knows what to do when a vessel comes into port. The process is still ongoing.

Question from a participant: What is the definition of fishing vessel in your fisheries act?

Dr Ford's response: Includes aircraft and drones.
Mr Kinol's response: PNG – drones, or anything supporting a fishing vessel.

Mr English asked how can Pacific economies better address capacity issues?

Mr Blaha's response: Co-operation: the better you cooperate together, the better the link. We share resources and problems. He talks to Mr Kinol about systems. The more we work together the more we benefit.

Question from a participant: Given the onus is on flag states to ensure their vessels how often is noncompliance due to genuine lack of knowledge of updated conservation management measures or fishing legislation by fishers. Is this something we need to improve on?

Mr Kinol's response: It is a challenge. Responsibility is with the port state.

Mr Tamehana's response: Sometimes it is hard to quantify due to language. Education provides a role. In New Zealand, our main role is to educate before we enforce and try to get a message out particularly for those who do not have internet and social media. We have to visit them personally to get the message across.

Mr Blaha's response: If you come to fish in our waters, you have the responsibility to comply with our regulations. As a skipper whatever happens on their boat is their responsibility. To claim you do not know, is a problem.

Mr English thanked the panellists.

6 Theme – Recommendations

Summary themes for the recommendations from the workshop were provided by Mr English and Mr Wright.

6.1 Economies to note that the most effective PSM programmes are those that target limited resources based on risk and intelligence.

6.2 Economies to note that some of biggest practical improvements come from using good dockside inspections. This allows for cross-referring log-sheets versus catch offloaded.

6.3 Economies are encouraged to recognise that tackling IUU works best when it is treated as a shared problem which requires cooperation on improving traceability of fish throught the supply chain.

6.4 Economies to note that voluntary compliance achieved through education and incentives is cost effective in improving compliance.

6.5 Economics are encouraged to use the Workshop virtual toolbox to enhance effectiveness, education and innovation in relation to PSM.

6.6 Economies are encouraged to continue to build their technical capacity in PSM through training, information and best practice exchange.

6.7 Economies are encouraged to increase investment in MSC/front line to monitor the activities of foreign vessels operating in APEC economy waters.

6.8 That APEC consider holding regular workshops on topics relevant to IUU including innovative technologies, coping with COVID-19 in the future and MSC training and programmes.

It was stressed that these recommendations were not binding, but are a way to progress discussions from the workshop. Participants were encouraged to provide feedback.

There will be another fishing group meeting in August 2021.

7 Closing Session

Mr English passed on his thanks to the participants, Andrew Wright, James Brown, Caleb Blackbeard, Carole Inkster, Lizzie, and Robyn Bennett.

An evaluation form for the workshop will be forward in due course.
The workshop finished at 1510 hours.